



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT/ MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 76 53
Fax : +91 431 252 07 19
Email : skaruna@bheltry.co.in
Web : www.bhel.com

TWO PART BID

Tender to be submitted in two parts.

Enquiry
Number:
2731100008

Enquiry
Date:
26.04.2011

Due date for submission
of quotation:
26.05.2011

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

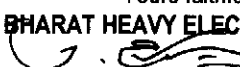
Item	Description	Quantity	Delivery (Item required at BHEL on)
10	Heavy Duty Industrial Helium Leak Detecting System Using Mass Spectrometer Leak Detector as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	01 No.	01.12.2011

Important points to be taken care during submission of offer

1. Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Subsequent to the hosting of this Enquiry, any corrigendum to the Enquiry that may be hosted in the BHEL Web-site as well as Government Tenders-portal shall be viewed by the vendors regularly to know the details of corrigendum. In case if any vendor without seeing the corrigendum quoted as per original Enquiry and intimate that they have wrongly quoted will not be considered and rejected. However as per the appropriate Policy of BHEL action will be taken on them in this regard.

BHEL's General guidelines / instructions (refer MM/CE/GT/001) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry referred above.

Tenders should reach us before 14:00 hours on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

Manager / MM / Capital Equipment

QUALIFYING CRITERIA FOR THE SUPPLY OF HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEM

The BIDDER / VENDOR has to necessarily provide the following details, for making an assessment of the firm's capability and competency:

[The BIDDER is expected to give complete details against each clause in the table given below and wherever necessary an additional sheet may be attached (giving clear reference number) to cover the required details]

S. No.	PARTICULARS	VENDOR's RESPONSE
1.0	Number of Years of Experience of the BIDDER/ VENDOR in the field of manufacturing and supplying HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS	
2.0	Number of HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS supplied, erected & commissioned till date. Model numbers, capacities and the sensitivities of supplied equipments shall be mentioned.	
3.0	Year of launch of the Models quoted against this Enquiry?	
4.0	Are there any other models launched after the quoted Models? Otherwise, indicate the likely year in which the next model is likely to be launched?	
5.0	Number of HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS supplied, erected & commissioned till date in the quoted Models?	
6.0	Number of HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS supplied, erected & commissioned till date for the different applications / customers.	

S. No.	PARTICULARS	VENDOR's RESPONSE
7.0	Details of Design Set-Up / Codes and Standards used.	
8.0	Details on International standards followed in Design of the Equipment (including analysis methodology and verification of equipment). Calibration standards of vacuum heads and meters and standard leak calibrators and their traceability to inter-national standards. Details regarding periodic recalibration and sources / tie-ups for such recalibrations including the proposed cost of calibration and lead time for calibration.	
9.0	Comprehensive Details on performance Testing - of the Equipments and all accessories quoted, ensured before dispatch? Supplier should have conducted a prove out performance test using the equipments or gathered data from users on the equipment performance. Sample references from renowned customers (in the International level) shall be added for similar models.	PERFORMANCE VALIDATION IS TO BE CONFIRMED BY THE SUPPLIER.
10.0	Details on manufacturing facilities – machining, forming, welding and heat treatment, material control with regard to its specialization like high vacuum capability, Helium leak testing facility, non destructive testing and final functional and proof testing facilities for this models. Details on selection of materials for suitability in high vacuum service – to have evidences on satisfactory performance of used materials regarding out gassing, baking, etc. Stages of Internal Inspection and Inspection by External Agencies [other than Customer Inspection]	
11.0	Details of Electrical/Electronic Control Panel Manufacturing and Testing Facilities.	
12.0	The Areas of Sub-Contracting Works and the Percentage of Sub-Contracting Works.	
13.0	Any Additional Data to supplement the manufacturing capability of the BIDDER.	

The BIDDER / VENDOR has to compulsorily meet the following requirements to get qualified for submitting an offer for the impact tester.

S. No.	REQUIREMENTS	VENDOR's COMMENTS
14.0	The BIDDER / VENDOR shall have a minimum of FIVE Years of Continuous Experience in the Design, Manufacture & Supply of HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS Kindly indicate the actual experience.	
15.0	The BIDDER / VENDOR shall have supplied at least one number of HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEMS & PORTABLE HELIUM LEAK DETECTORS OF THIS CAPACITY in the last 5 years . Kindly confirm and indicate the number of equipments (quoted model) sold in 2005/08 in the world.	
16.0	The bidding FIRM should have 'in-house' or 'self-owned' facility for FABRICATION and TESTING at the rated capacity.	
17.0	Reference List of Customers and Performance Certificates from CUSTOMERS (minimum 2 Customers) with full contact details of CONTACT PERSON.	
18.0	The BIDDER / VENDOR should have sound financial position and should furnish the Finance Statements (Summary of P & L Statement and Balance Sheet) for the immediate past three years.	
19.0	In case of short listing by the Purchaser in the process of vendor assessment, the BIDDER / VENDOR has to co-ordinate for the visit of Assessing Team, to the WORKS of the BIDDER / VENDOR with a notice period of 10 Days.	

The BIDDER / VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser:

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
20.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical & Commercial and Price Bid. The Technical Offer shall be in line with the BHEL's Technical Specifications and the Guidelines or Annexures mentioned, wherever applicable.	
21.0	The Technical Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause of the specifications.	
22.0	A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
23.0	The Technical Offer shall be supported by Product Catalogue, drawings, manuals and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria. This should include operational and maintenance spares also.	
24.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
25.0	The reference List of Customers shall be accompanied with the details (Phone Number/E-Mail ID) of the CONTACT PERSON for cross reference	

TECHNICAL SPECIFICATIONS FOR A HEAVY DUTY INDUSTRIAL HELIUM LEAK DETECTING SYSTEM [USING MASS SPECTROMETER LEAK DETECTOR - MSLD]

GENERAL :

Heavy Duty Industrial Helium Leak Detecting System or Mass spectrometer leak detector of heavy duty type is going to be used for conducting Helium leak testing of products like heat exchangers and pressure vessels during the manufacture by three types of testing, viz, pressure testing, vacuum testing and pressure vacuum testing. Basically, the system shall consist of set of vacuum pumps – mechanical and diffusion / turbo molecular pumps and with or without cold traps and capable of creating high vacuum levels of the order of 10^{-3} mbar or better in the analyser tube (also called as spectrometer tube) for Helium leak detection. Both sniffer probe and vacuum type Helium leak tests have to be conducted using this equipment. It shall contain panel board and hand held remote for vacuum (starting from atmospheric pressure up to the highest level of vacuum achievable by the equipment) and leak indication. Suitable vacuum gauge heads shall be provided integral with the equipment for vacuum measurement and the same shall be indicated on panel board and remote. Also, the equipment should have in-built standard calibrator for auto calibration of the equipment. The port size suiting to DN40 or DN25 adopters are to be available for connecting jobs for leak detection. This equipment shall be capable of directly evacuating jobs up to 1000 litres volume without auxiliary pumps (in about 90 - 150 minutes time) to a vacuum level of 10^{-4} mbar or better for direct vacuum tests. Also, they shall be capable of working parallel with heavy duty pumping stations (operating at high vacuum levels) operated using diffusion or turbo-molecular pumps for evacuating higher volume jobs. The equipment has to work in this type of jobs both along with auxiliary pumps during pumping mode and with pumps isolated condition using valves during leak detection mode.

Standard accessories like vacuum heads, vacuum meters, cables, standard calibrators for vacuum tests (both fine and gross versions) and for pressure tests, portable sniffing helium leak detector and sniffer probes (auto and manual versions) shall be supplied along with the equipment. Also, required spares for 3 years of operation and maintenance and operating and maintenance manuals (for equipment and accessories in English language only) shall be supplied. The equipment shall be capable of working in the voltage range of 200-240 volts single phase supply or 415 – 430 volts three phase supply. Helium leak Calibrators, leak detector and vacuum gauges and meters shall be supplied with required calibration certificates traceable to International standards.

DETAILED SPECIFICATIONS :

S.No.	FEATURES	BHEL SPECIFICATION
1.0	APPLICATION:	
1.1	HELIUM LEAK TESTING	The proposed system is to be used for the detection of rate of leak of Helium Gas from critical production components and assemblies (like Heat-Exchangers) during inspection and functional testing.
1.2	Method of Testing	Spray Mode (vacuum type) & Sniffing Mode (pressure type)
2.0	SYSTEM CONFIGURATION:	
2.1	The system offered shall have	a) Mass Spectrometer Leak Detector with Pre-Amplifier b) Vacuum Gauges and Accessories

S.No.	FEATURES	BHEL SPECIFICATION
	the configuration as per BHEL Specification (See Clause 3.0 to 11.0 described below)	c) Sniffer Probes d) Portable Sniffing Helium Leak Detector e) Standard Leak Calibrators with Isolation Valve for Vacuum Test f) Standard Leak Calibrators with Isolation Valve for Pressure Test g) Gross Leak Calibrators h) Accessories
3.0	GENERAL REQUIREMENTS FOR THE SYSTEM:	
3.1	Type	The equipment shall be easily transportable from place to place by means of a transport cart or wheeled carriage to be supplied with the equipment
3.2	Mode of Operation	Capable of working in Vacuum Type, in Pressure Type and pressure vacuum Helium Leak Tests.
3.3	Handling Volume	The vacuum system of the Leak detector shall be capable of evacuating a volume of minimum 1000 litres without the support of any auxiliary vacuum pump. This capability of directly evacuating jobs up to 1000 litres volume without auxiliary pumps is to be achieved in about 90 minutes -150 minutes time (in jobs which are reasonably clean and without much flow restrictions) and a vacuum level of 10^{-4} mbar or better shall be achieved in jobs for direct vacuum tests.
3.4	Tandem Working	Where the volume of part under test is more than 1000 litres, the leak detector system shall be capable of working in tandem with auxiliary pumps used for evacuating the vessel (not in supplier's scope), in the following conditions: a) with mechanical pump capable of generating a vacuum of the order 4×10^{-2} milli bar. b) With a combination of mechanical pump and diffusion pump or turbo molecular pump, capable of generating a vacuum of the order 1×10^{-3} to 1×10^{-4} milli bar.
3.5	Power Input	415 \pm 10% V AC, 3 Phase, 50 \pm 3% Hz, 3 Wire + Protective Earth (PE) System. OR 230 \pm 10% V AC, 1 Phase, 50 \pm 3% Hz, 3 Wire System (2Wire + PE) (Input power will be provided at one point only)
3.6	Input Power Cable	A 10 m long sheathed power input cable is to be provided with the equipment.
3.7	Ambient Conditions	Temperature of working 15 to 45 ° C & at Humidity up to 85 % (maximum)
3.8	Service Life (in operating hours)	Bidder shall clearly specify life of equipment in total and that of the sub-systems .
4.0	MASS SPECTROMETER HELIUM LEAK DETECTOR WITH PRE-AMPLIFIER:	
4.1	Type	Mass Spectrometer type with pre-amplifier
4.2	Measurement Range (for Helium)	5×10^{-12} std cc / sec (or better) to 10 std cc / sec in Vacuum Mode 2×10^{-10} std cc / sec to 10 std cc / sec in sniffing mode

S.No.	FEATURES	BHEL SPECIFICATION
4.3	Sensitivity	Helium Leak-Rate of 5×10^{-12} std cc/sec or better.
4.4	No of Test Ports	Two
4.5	Test Port Connection	a) Quick Vacuum Coupling for connecting an 1 ½ inch OD (outer diameter) tube. – 2 Nos OR b) DN 40 Flange with Vacuum Clamp – 2 Nos OR DN 25 Flange with Vacuum Clamp – 2 Nos
4.6	Filament non Tripping feature in low Vacuum (while working in tandem with aux pumps)	The leak detector shall be suitable for connection directly to a low level of vacuum without the filament tripping off. The supplier has to specify (in the offer) – a) Maximum operating vacuum level b) Minimum operating vacuum level for direct connection without filament tripping
4.7	Integrated Pumping system comprising of:	
4.7.1	Roughing Pump	
a)	Rating	Direct drive type with a rating of 20 cfm or more
b)	Type, Number of Stages and Complete Technical details	Bidder to specify
4.7.2	Fore Pump	
a)	Purpose	To serve as a back-up pump for the High Vacuum Pump
b)	Rating	Direct drive type with a rating of 8.0 cfm or more
c)	Type, Number of Stages and Complete Technical details	Bidder to specify
4.7.3	High Vacuum Pump	
a)	Purpose	To generate required high vacuum level
b)	Rating	150 to 200 litres per second.
c)	Type (Bidder to furnish complete technical details)	Diffusion pump with liquid nitrogen cold trap OR Hybrid turbo molecular drag pump
4.7.4	Helium Pumping Speed	25 to 30 litres /second, when high vacuum is maintained in the leak detector system and at spectrometer tube flange Bidder to confirm that pumping speed will be sufficient to maintain the lowest required background vacuum level for sensing of Helium signals.
4.8	Auto-Calibration	With a built-in temperature compensated Helium leak standard in the range of 5×10^{-8} std.cc/sec. to 3×10^{-7} std.cc/sec. @ 22 deg Celsius (Necessary Certificate of Calibration should be supplied along with the equipment for the leak standard)
4.9	Helium Background (Leak	On connecting a sniffer probe to the equipment, the unit background (leak meter reading) shall not be more than 4 x

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	Meter Reading)	10^{-9} std.cc/sec
4.10	Response Time & Clean up Time	Necessary Certificate of conformance shall be submitted along with the equipment for below mentioned response time & clean-up time
	Situation	Response Time
		Clean-Up Time
a)	Equipment Separately	< 1 Sec
b)	Equipment on connecting to a Vacuum of 10^{-2} milli bar in a system volume of 50 m^3	< 5 sec
c)	Equipment on connecting to a Vacuum of 10^{-4} milli bar in a system volume of 50 m^3	< 5 sec
d)	Equipment on connecting a sniffer probe of size 100 to 125 microns at atmospheric pressure	< 3 sec
4.11	Controls	Integral Control Panel For Auto Start-Up, Tuning, Calibration, Zero Setting, Shut-Down, Auto-cycle etc.
4.12	Start-up Time	Less than 2 min with single button operation
4.13	Port Change over time for testing	Less than 10 sec
4.14	Alarm	Audio Alarm when the value of 'rate of leak' exceeds the adjustable pre-set value. The pre-set value shall be adjustable over the entire range of measurement
4.15	Auto-diagnostic System	Display of error message
4.16	Integral Display Unit	
a)	For Leak Rate	Both Analogue & Digital read-out a. Analogue display should be provided with selector switch for measurement range. (Bidder to mention the different ranges) b. Digital display Type (Direct Reading) – Bidder to mention type of display c. Bar Graph Display
b)	For Machine Parameters and Status	Bidder to mention
4.17	Remote Control Unit	a. Suitable remote function/control unit to be provided with buttons/knobs for the operation of the equipment from a maximum distance of 10 metres from the equipment. b. The remote shall be connected to the main equipment by means of a coiled (spring type) cable for an effective length of 10 metres. c. A cord-less remote control unit may be offered as an OPTIONAL, having an effective operative distance of 10 metres.

S.No.	FEATURES	BHEL SPECIFICATION
		d. The remote control unit shall also have digital / bar-graph display of the leak rate.
5.0	VACUUM GAUGES WITH ACCESSORIES:	
5.1	Application	Vacuum Gauges are required for continuously recording the vacuum during the course of vacuum generation and vacuum maintenance during isolation / holding in Helium Leak Testing by Vacuum Method and in Ultra High Vacuum Holding Tests.
5.2	Quantity	Two Numbers.
5.3	Mounting	Directly to Vacuum Side using DN25 ISO-KF Type Connection
5.4	Operating Range	Vacuum from atmospheric pressure down to 5×10^{-10} milli bar using a single gauge.
5.5	Operating Principle	Based on the measurement principle of thermal conduction / ionisation.
5.6	Controller	Suitable Controller shall be supplied (Bidder to furnish details) with a 2m long cable connecting to the gauge.
5.7	Display	The controller shall have a digital or analogue read-out to indicate the measured reading, covering the complete range specified in 5.4 above
5.8	Measurement Accuracy	Shall be better than or equal to $\pm 15\%$ of value
5.9	Measurement Repeatability	Shall be better than 5% .
5.10	Temperature Coefficient	Shall not be more than 3% per degree Celsius
5.11	Power Supply	$230 \pm 10\%$ V AC, 1 Phase, $50 \pm 3\%$ Hz, 3 Wire System (2Wire + PE)
5.12	Certificate of Calibration	Vacuum Gauges shall be supplied with the Certificate of Testing and Calibration
6.0	SNIFFER PROBES:	
6.1	Application	On connecting the standard sniffer probe, it shall be capable of sensing the leaks released at atmospheric pressure side from pressurised objects, when the probe tip is moved past the leak.
6.2	Desired Vacuum Level at Sniffer Probe Tip	75 to 100 mm Hg
6.3	Type	a) Standard sniffer probes suitable for fast response with orifice size given in the next clause. b) The sniffer probes shall be motorised to ensure that background Helium level is not exceeded. The desired back ground in the Helium free open atmosphere = 4×10^{-9} std.cc/sec or lower.
6.4	Orifice Sizes	a) 50 to 75 microns b) 100 to 125 microns c) 150 to 200 microns
6.5	Probe Hose Length	Bidder to Specify
6.6	Quantity	3 Nos (one number in each orifice size)

S.No.	FEATURES	BHEL SPECIFICATION
7.0	PORTABLE SNIFFING HELIUM LEAK DETECTOR:	
7.1	Application	Sniffing Style Leak Detection from Pressurised Chambers. Measurement on atmospheric side. Unit should be portable.
7.2	Type	Mass Spectrometer Based
7.3	Measurement Range	1×10^{-8} std cc / sec to 1 std cc / sec
7.3.1	Smallest Detectable Helium Leak Rate	1×10^{-8} std cc / sec
7.4	Vacuum System	Shall be integral (Bidder shall furnish complete technical details)
7.5	Response Time	Bidder to Specify
7.6	Clean-up Time	Bidder to Specify
7.7	Control & Functions	Auto-Zeroing function, Quick Start-up
7.8	Display	a) Display of Leak Rate b) Display of Vacuum Level at Mass Spectrometer Tube (Graphical / Digital Display - Bidder to specify type of display)
7.9	Annunciation	Audio Alarm indicating leak
7.10	Sniffing Probe	To be supplied with unit. Bidder to furnish probe length.
7.11	Weight of Unit	Bidder to specify (A single person should be able to hand-carry the unit)
7.12	Power Supply	$230 \pm 10\%$ V AC, 1 Phase, $50 \pm 3\%$ Hz, 3 Wire System (2Wire + PE). Necessary cable with plug should be supplied
7.13	Test & Calibration Certificate	Should be supplied along with the equipment
7.14	Quantity	One Number only.
8.0	STANDARD HELIUM LEAK CALIBRATORS FOR VACUUM TYPE LEAK TEST:	
8.1	Application	a. Standard Helium Leak Calibrators are required for tuning the MSLD and to certify the sensitivity of the equipment. b. Calibrators are also required for the calculation of system sensitivity in the vacuum type and pressure vacuum type helium leak tests.
8.2	Quantity	2 numbers in each range, given in the next clause.
8.3	Helium Leak Rate of Calibrator	a. Any Value Between 5×10^{-7} std cc/sec. and 6×10^{-7} std cc/sec. b. Any Value Between 7.5×10^{-6} std cc/sec. and 8×10^{-6} std cc/sec.
8.4	Type	Glass Permeation Type
8.5	Helium Fill	Pure Helium filled at min 1.0 kg/sq.cm (abs.) or higher.
8.6	Filling Volume	Calibrators shall be reservoir type with filling volume in the range of 150 to 250 cc.
8.7	Container	The material of the container shall be stainless steel

S.No.	FEATURES	BHEL SPECIFICATION
		or aluminium.
8.8	Isolation Valve	Calibrators shall have a built-in isolating valve to allow or block the flow of Helium into the leak detector or vacuum system.
8.9	Accuracy	The accuracy of leak detection with respect to rate engraved on the calibrator and the actual value shall be better than or equal to $\pm 10\%$.
8.10	Temperature Coefficient	The temperature coefficient which affects the leak rate due to temperature change shall not be more than 3% per degree centigrade.
8.11	Pressure Loss	Loss of Helium Gas pressure inside the reservoir shall be limited to a maximum of 2% per year due to continued use or exposure to high vacuum.
8.12	End Connection	The end connection for connecting the calibrator to leak detector or vacuum system shall be of ISO-KF/DN 25 Flange Type with nominal I.D. (Inner Diameter) of 25 mm, to achieve connection using an "O" ring and Aluminium cap. Alternatively the end shall be a tube fitting with O.D. (Outer Diameter) 30mm to achieve connection by inserting into matching hole and tightening the screwed cup provided with 'O'-Ring .
8.13	Certificate of Calibration	Calibrators shall be supplied with the Certificate of Testing and Calibration as per Calibration Standard T-1063.1 of ASME SECTION V
9.0	STANDARD HELIUM LEAK CALIBRATOR FOR PRESSURE TYPE LEAK TEST:	
9.1	Application	This is required for determination of system sensitivity in pressure type / sniffing type Helium leak test
9.2	Quantity	2 Numbers.
9.3	Helium Leak Rate of calibrator (when Upstream Pressure is 1 bar (abs) and down stream pressure is the high vacuum of the leak detector)	Any value in the range 5×10^{-7} std cc/sec. to 3×10^{-6} std cc/sec .
9.4	Type	Capillary Type
9.5	Helium Fill	Pure Helium filled at min 2.0 kg/sq.cm (abs.)
9.6	Filling Volume	Calibrators shall be reservoir type with filling volume in the range of 500 to 1000 cc.
9.7	Container	The material of the container shall be stainless steel or aluminium.
9.8	Isolation Valve	Calibrators shall have a built-in isolating valve to allow or block the flow of Helium into the sniffer connected to the leak detector / atmospheric pressure side.
9.9	Accuracy	The accuracy of leak detection with respect to rate engraved on the calibrator and the actual value shall be

S.No.	FEATURES	BHEL SPECIFICATION
		better than or equal to +/- 10 %.
9.10	Temperature Coefficient	The temperature coefficient, which affects the leak rate due to temperature change, shall not be more than 3 % per degree Celsius.
9.11	Pressure Loss	Loss of Helium Gas pressure inside the reservoir shall be limited to a maximum of 2 % per year due to continued use.
9.12	Flow Control	Either by variation of upstream pressure or by variation of flow using the isolation valve (Bidder to furnish method to be adopted)
9.13	End Connection	Special adapter fitting suitable for the sniffer
9.14	Verification of Leak Rate	Leak rate of the calibrator shall be certified based on the upstream pressure of 1 Kg / sq. cm (abs) & down stream high vacuum of leak detector. The bidder shall furnish the method by which this can be verified by us at any point of time while putting the calibrator to use.
9.15	Certificate of Calibration	Calibrators shall be supplied with the Certificate of Testing and Calibration as per Calibration Standard T-1063.2 of ASME SECTION V
10.0	GROSS LEAK CALIBRATORS:	
10.1	Application	For low vacuum type helium leak tests to calibrate the leak detector for gross leak measurements.
10.2	Leak Rate	1×10^{-3} std.cc/sec. range
10.3	Quantity	One Number only.
11.0	ACCESSORIES:	
11.1	All the accessories required to integrate the various sub-systems shall be offered. The accessories offered shall be listed and their application shall be described. Accessories shall include the inter-connecting cables, end-connectors, valves, flanges, fittings, packings, seal-kits, etc., so that the equipment is delivered in a READY TO USE condition.	
12.0	SPARES:	
12.1	Complete List of Spares – both Mechanical & Electrical - including Control-Transformers, Printed Circuit Boards, Fuses, Cooling Fan, Pump, Drive Belts, End Connectors, Control Cables, etc., required for two years of operation on three shift basis, to be compulsorily LISTED and QUOTED ITEMWISE	
12.2	Supplier shall clearly specify the number of years for which spares will be supplied for each item of the system after that item becomes obsolete.	
13.0	O & M MANUALS:	
13.1	Manuals to be Supplied with Equipment	Separate Operational Instructions & Maintenance Manual shall be given for the following: a) Mass Spectrometer Leak Detector including the vacuum systems pumps b) Vacuum Gauge c) Sniffer Probes d) Portable Sniffing Helium Leak Detector e) Standard Leak Calibrators f) Accessories
13.2	Contents of the Manual	The O & M Manual shall contain details like: a) Operation Instructions

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		b) Description & Constructional Details c) Mechanical Assembly Drawings d) Part Drawings e) Electrical Schematic Drawings f) Bill of Materials i) Printed Circuit Board Schematics k) Technical Leaflets of Bought-Out Items l) List of Spare Parts (Both Electrical & Mechanical) with Make, Specifications/Ratings k) Trouble Shooting Details l) Safety Instructions – For Erection, Operation and Maintenance.
13.3	No of Copies	Hard Copies in Original 3 Sets Soft Copy on CD 1 No
13.4	Language	English
14.0	GENERAL POINTS:	
14.1	Inspection	The equipment shall be offered for inspection at supplier's works for performance evaluation prior to despatch. The bidder shall detail the method which will be adopted to prove the performance of equipment meeting our specification.
14.2	Commissioning	a. The equipment shall be commissioned at BHEL Works, by the Supplier's Service & Application Engineers. b. Equipment Performance Prove-Out has to be done by conducting trials, as per specification parameters.
14.3	Training	a. BHEL Engineers shall be trained in Equipment Operation and Maintenance, at the Supplier's Works. b. Training shall also be provided at BHEL Works for the Operators.
14.4	Guarantee	The total system shall be guaranteed for performance and efficient functioning of machine components for a minimum period of twelve months from the date of commissioning.
14.5	Catalogue Copy And Manual for Evaluation	1. Product Catalogues (in original) for various Sub-Systems offered, shall be given with the offer. 2. One Copy of O&M Manual shall be submitted along with the offer for Evaluation.
15.0	IMPORTANT NOTES:	
15.1	The supplier shall give point-by-point confirmation by elaborating the technical feature of the offered system, with reference to the above specification. Additional literature on principle of operation shall be given. Just mentioning 'YES' or "CONFIRMED" is not acceptable.	
15.2	Deviation statement (if any) shall be given along with the offer.	
15.3	Price bid shall contain price for each item offered, including Spares and Consumables.	
15.4	The un-priced price bid indicating clearly the offered items shall be enclosed along with the technical offer.	
15.5	Offers incomplete with respect to the above are liable for rejection.	